Field Investigations

Quality Assuring

Continuous Emissions Monitoring Data

CLEAN AIR
MARKET PROGRAMS

Audit Program Goals

- To ensure that the data reported in the EDRs are of good quality. (Data Accuracy)
- To affirm compliance with Part 75 monitoring regulations. (Consistency)
- To encourage sound CEMS management practices.
  - Conduct internal reviews/audits
  - Seek Part 75 training for CEMS staff
  - Conduct systematic review of quarterly report data & QA test data prior to data submittal

CLEAN AIR MARKET PROGRAMS

Audit Program Components

- Electronic Audits
  - Performed By CAMD Staff

- Field Audits
  - Performed by State & Region Inspectors

CLEAN AIR MARKET PROGRAMS

Electronic Audits

- CAMD conducts Quarterly Electronic Audits on each quarterly report using the Monitoring Data Checking Software v3.3. (MDC v3.3)
  - Identify import errors
  - Evaluates for errors in the current Monitoring Plan
  - Evaluates each QA test and recalculates results.
- Feedback Reports are sent to the Source, Region, & State agency
  - Critical errors should be fixed by the source and the EDR resubmitted
- Developing Emissions vs. QA auditing capacity for 2002

CLEAN AIR MARKET PROGRAMS

Benefit and Limitation

- Benefit:
  - Electronic Audits verify
    - » That the MP and QA test data are complete and reported in an acceptable manner
    - » That the basic elements of the test requirements were followed.

- Limitation:
  - Current Electronic Audits do not verify
    - » How the QA tests were performed
    - » That no “shortcuts” were taken in the reference methods
    - » That the QA data reported is accurate

CLEAN AIR MARKET PROGRAMS

Field Audits

- Are performed by State and Region inspectors
- Activities include:
  - Targeting
  - Audit Preparation
  - Pre-Audit Meeting
  - Records Review
  - Visual Inspection of the Monitoring Systems
  - Performance Demonstration
  - Post Audit Meeting
  - Audit Report

Field Audit Levels

- Depend upon the type of the Performance Demonstration used in the audit.
  - Level 1 - Observation of a Daily Calibration
  - Level 2 - QA Test Observation
    - » Quarterly Linearity
    - » Annual RATA
  - Level 3 - Audit QA Test
    - » Linearity Check (3 pt. Cylinder Gas Audit)
    - » RATA - Relative Accuracy Test Audit
    - » Single Gas Challenge

Benefits of Field Audits

- Provide verification of Data Quality
- Field Audits verify that a sources “day to day” CEM QA/QC activities are:
  - Documented
  - Implemented
  - Effective
- Provide incentive for managers to commit resources to monitoring
  - Fosters improvements in CEM System operating practices
  - Encourage sources to self-audit

Other Components of Data QA

- Observation of Initial Certification Tests
- Observation of Annual QA testing
- Review of Hardcopy Certification and Annual RATA reports

- These assure that:
  - Testing is performed correctly
  - No “shortcuts” were taken in the methods
  - The reference method was properly calibration and QA
  - Result data are supported by the raw method data

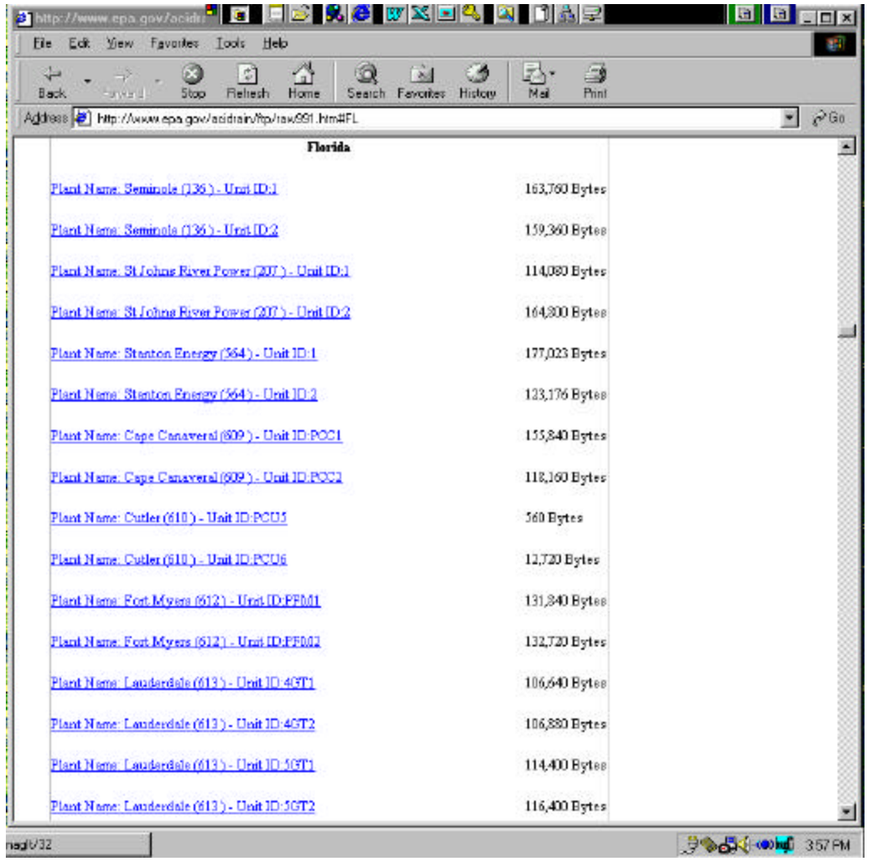
CAMD Target List

- Criteria for the list include:
  - Low Percent Monitor Availability (PMA)
  - Extended periods of missing data
  - Aborted or failed QA tests
  - Missing QA tests
  - Failed Daily Calibrations
  - Data Miscalculations
  - Additional Measures under development
- Sources may also be recommended at random for a Field Audit

Audit Preparation

- Contact the Facility's Designated Representative and/or Environmental Coordinator to schedule the Field audit.
- Gather information needed to prepare for the field investigation
  - Are tri-blends used for daily calibrations and linearities?
  - Unit’s Operational Status
  - Plant personnel Availability

Historical Data Review



- Evaluate and review recent electronic data submissions:
- EDR data can be downloaded from the CAMD website

http://www.epa.gov/airmarkets/emissions/raw/index.html

- Data is compressed
  - Use explode.exe to uncompress files in MS-DOS

CLEAN AIR MARKET PROGRAMS

Reviewing EDRs

- In reviewing EDR data, check the following:
  - calculation of emission rates from raw data
  - missing data substitution
  - list the monitoring components and compare them to what you find at the facility
  - look at quarterly QA test results.
  - daily calibrations
- Review the source's ETS feedback report (obtain from CAMD)
  - Have any/all error detected been resolved?
  - If the status code is a 5, how does the source plan to resolve the discrepancy?

CLEAN AIR MARKET PROGRAMS

Tools for Reviewing EDR Data

- Monitoring Data Checking Software v3.3 (MDC)
  - Review and Print Monitoring Plan
  - Review and Print QA tests
  - Review and Print RT550
    - » “Reasons for Monitoring System Downtime or Missing Parameters” if available
  - Review and Print RT556
    - » “Monitoring system Recertification, Maintenance, or other events.” if available
  - Help function (error resolution)

CLEAN AIR MARKET PROGRAMS

Tools for Reviewing EDR Data (continued)

- MDC Hourly
  - Will replace Revu2000
  - Expanded Hourly Emission Data Checking Capabilities . . . .

In the works

- MDC Hourly
  - Will replace Revu2000
  - Expanded Hourly Emission Data Checking Capabilities . . . .

Pre-Audit Meeting

- Review Objectives of System Evaluation
- Agenda
  - Inspection of CEMS
  - Records Review
    - » Maintenance Logs
    - » Selected Data
    - » QA plan and supporting records
  - QA Checks
    - » CGA/Linearity Check
    - » Opacity Calibration Error Check
    - » Plant Personnel requirements (hands off policy)

Records Review

- The purpose of the records audit is to:
  - verify the performance of maintenance activities
    - » Corrective
    - » Preventative
  - authenticate quarterly report data
  - verify system parameter settings

Records Review

- Records to be reviewed include:
  - QA/QC Manual
  - Maintenance Logs
  - Preventative Maintenance Documentation
  - Daily Checklists
  - Equipment User Manuals
  - Calibration Gas Bottle Certificate of Analysis
  - Missing Data Report (from source's DAHS)
  - Alarm Summary (from source's DAHS)
  - Hard Copy Linearity & RATA reports

CLEAN AIR MARKET PROGRAMS

Visual Inspection of CEMS

- CEM Shelter
- Analyzers
- Flow Monitors
- Air Cleaning Sub-System
- Calibration Gas Bottles
- DAHS

CLEAN AIR
MARKET PROGRAMS

Audit Levels

- Level III Data Quality Demonstrations
  - Independent Challenge of the System by the Auditor(s)
    - » Linearity Check (Cylinder Gas Audit)
    - » RATA - Relative Accuracy Test Audit
    - » Single Gas Challenge
- Level II Data Quality Demonstrations
  - Observation of RATA or Linearity
- Level I Data Quality Demonstration
  - Observation of Daily Calibrations

CLEAN AIR MARKET PROGRAMS

What to look for When Observing A RATA

- Gas CEMS (Methods 6C, 7E, & 3A)
  - Was a daily calibration error check conducted for the CEMS prior to the testing?
    - » What were the zero and upscale calibration error results?
    - » Were they acceptable?
  - Were any pre-RATA adjustments made to the CEM system?
    - » If so, what?
  - Is the RM setup consistent with the requirements of the method?
  - Verify the calibration gas certifications used to calibrate RM
    - » concentrations
    - » expiration date of certification
    - » cylinder pressure > 150 psi
    - » Protocol

CLEAN AIR MARKET PROGRAMS

What to look for When Observing A RATA

- Were the RM analyzer linearity calibrations acceptable?
- Bias/Drift checks performed before and after each run?
  - » Was the calibration gas sent through the entire system from the probe down?
  - » Was the calibration gas selected for the upscale bias check the one that most closely approximates the effluent concentration?
  - » Are the results acceptable? (Bias < 5% of span, Drift < 3% of span)
- Were at least 3 traverse points selected?
  - » What points are selected? How do they relate to the Stack Diameter?
  - » Do these points conform with the requirements of Part 75, App A §6.5.6
  - » If short measurement line is selected, is stratification likely to occur?
    - If so, were the required pre-test stratification tests performed?
    - Are the results acceptable?

CLEAN AIR MARKET PROGRAMS

What to look for When Observing A RATA

- Were any prohibited maintenance or adjustments made during the test to either the CEMS or RM?
- Was the leak check completed successfully?
- Was the primary fuel combusted during the RATA?
- What load was the unit operating at during the RATA?
  - » Was this a normal load? (representative of normal operation)
  - » Was the load maintained through the test?
- Are data reduction and calculations performed on site by the tester?
  - » How are the calculations performed?
  - » Is the Bias correction performed correctly?
  - » Are the measurements on a wet or dry basis?

CLEAN AIR MARKET PROGRAMS

What to look for When Observing A RATA

- If moisture corrections are to be made
  - » What method was used to determine the Stack moisture?
  - » At what frequency is the moisture determined?
  - » Wet-bulb Dry-bulb approximation method are not allowed for making moisture corrections. (only allowed for MW determinations)
- What is the RA result?
- Were good practices followed in conducting the RATA?

What to look for When Observing A RATA

- Stack Flow RATA
  - Which flow method is the tester using?
  - Is a Wall Adjustment Factor (WAF) used? Default or Stack Specific?
  - RM pitot type (Type S, standard, other?)
  - Differential Pressure devise (manometer, magnahelix, transducers?)
  - Is the RM set up consistent with the requirements of the method?
  - How is moisture determined? At what frequency?
  - Leak checks?
  - Does the stack cross sections area used in the calculations documented in plant records?
  - RM Traverse Points? What are they?

What to look for When Observing A RATA

- Was the primary fuel combusted during the RATA?
- What load was the unit operating at during the RATA?
  - » Was this a normal load? (representative of normal operation)
  - » Was the load maintained through the test?
- Are data reduction and calculations performed on site by the tester?
  - » How are the calculations performed?
  - » Is the Bias correction performed correctly?
  - » Are the measurements corrected to wet or dry standard conditions?

What to look for When Observing A RATA

- Other Points
  - CO2 reference method for CO2 systems
  - Method 4 moisture RATA for H2O Systems
  - Do not RATA O2 Components of each against an O2 RM
  - Wet-bulb Dry-bulb approximation method are not allowed for making moisture corrections. (only allowed for MW determinations)
  - No “rake” probes

Observing Linearities & Daily Cals

- The unit should be operating at a normal stable temperature
- Check the gas certificates
  - Protocol
  - Concentrations within range specified for the span
  - Expiration date
- Regulator
  - Cylinder Pressure > 150 psi
  - Delivery pressure match daily cal delivery pressure
  - Delivery Flow rate match daily cal flow rate
  - Delivery Flow rate > sampling rate for CEMS

Observing Linearities & Daily Cals

- Response time should be consistent with cycle response test records
  - SO2 monitor will seem to lag compared to NOx and CO2 response
  - Response time < 15 minutes per injection
  - Analyzer should be stable before recording a response
- How are the calculations performed?
- No consecutive injections of the same concentrations allowed
  - HMLHMLHML **NOT** HMLLMHHML

Post-Audit Meeting

- Recaps the System Evaluation for the Facility Management.

- Allows for discussion of preliminary issues that require management action or understanding

- Covers what is to be discussed in the System Evaluation Report
  - No surprises

Post Audit Review

- Review notes and checksheets as soon as possible upon returning to office.
- Double check electronic data files against field notes.
  - Event dates and times
  - Relative Accuracy (RA value)
  - Linearity Checks (LE value)
- Explanations of events or data incidence

Audit Report

- Cover letter
  - ORISPL number
  - Plant Name and Unit ID’s
  - Audit Level - Summary of Audit Activities
  - Audit Date
  - Summary of Audit Results
  - Follow-up actions (if any)
- Audit Report
  - Information must be accurate, relevant, complete, objective, and clear.
  - All compliance issues should be linked to the regulatory requirements.
  - Recommendations and follow-up should be clearly state.
  - Any checklist and forms used should be included to support the report.

Audit Report

- Summarizes the CEM Field Audit
  - Discusses each aspect of the evaluation
  - Presents findings, and results
- Facility Draft Review (optional)
  - Assures that the facts are correct
  - Assures that the issues are presented accurately
  - Allow source with problems to draft a response explaining how the issues identified in the report are to be addressed. (if necessary and optional)

Audit Report

- Copies sent to:
  - Clean Air Markets Division
  - Regional Office
  - District and Local Agency Office
  - Facility

Follow-up

- Follow up with the source to see that potential problems identified in the audit are resolved.
- Notify CAMD of any major issues that may relate to data validation or missing data for guidance.
- Continue to audit hardcopy reports sent by the facility to identify reoccurring or new QA problems.